U.S. ARMY CHEMICAL MATERIALS AGENCY

White phosphorus

Military designation: WP

Description: White phosphorus is a highly reactive elemental compound that oxidizes rapidly when exposed to air, forming phosphorus pentoxide, phosphorus trioxide and other polyphosphoric acids. Pure white phosphorus is a colorless to white waxy solid, but the commercial product may have a slight yellowish color. White phosphorus has a garlic-like smell.

Non-military uses: White phosphorus is used mainly for producing phosphoric acid and other chemicals. These chemicals are used to make fertilizers, additives in foods and beverages, cleaning compounds and other products. Small amounts of WP have been used as rat and roach poisons and in fireworks. In the past, white phosphorus was used to make matches, but other chemicals with fewer harmful effects have now replaced it.

Military uses: WP has been used as a smoke and obscurant in munitions such as mortar rounds, artillery projectiles and grenades. When ammunition-containing white phosphorus is fired or detonated in the field, it burns and produces both fumes and vapors. In military operations, WP smoke is used to protect potential targets and conceal movement of personnel and material.

Health effects: The combustion products of burning white phosphorus are irritating to the nose, throat and lungs. Severe coughing, shortness of breath or chest tightness may occur. The onset of these difficulties may be delayed for several hours. Upon contact with the skin, white phosphorus particles that have ignited may produce severe and deep second-and third- degree skin burns. White phosphorus smoke is especially irritating to the eyes. Signs of ocular irritation may include uncontrollable blinking, an aversion to bright light and tearing. Solid particles in the eye may produce severe injury to the cornea. If WP is swallowed, nausea, vomiting and abdominal pain may occur after a delay of a few hours. The symptoms may disappear in 24 to 36 hours. However, soon after their disappearance, the nausea, vomiting and abdominal pain may reappear with diarrhea and a yellow color to the skin. Repetitive or prolonged exposure to white phosphorus can cause “phossy jaw” with pain and swelling of the jaw, toothaches, loosening of the teeth and destruction of the jawbone. Chronic exposure to white phosphorus can also cause weakness, anemia, loss of appetite, stomach complaints and paleness. Long-term white phosphorus exposure can also cause bones to become brittle and break. It is unknown whether chronic white phosphorus exposure can cause cancer, birth defects, or affect reproduction in people. WP may affect the body through inhalation, ingestion or skin contact

Environmental fate: White phosphorus reacts with oxygen in water and usually stays in surface water for a period of hours to days. Unreacted white phosphorus may stay in soil for a few days before it is converted to less harmful chemicals. However, chunks of white phosphorus coated with protective layers may stay in oxygen-depleted water or soil for many years, particularly in deeper soil and in the bottom sediment of rivers and lakes where there is little oxygen.

For more information, contact the CMA Public Affairs Office at
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